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(54) Power supply system for use in a hazardous environment

(57) A system for supplying electrical power to a device 1, particularly lights, to be used where there is a fire or explosion risk includes a generator 5 driven by a hydraulic motor 3, the device 1, motor 3 and generator 5 all being housed in container 2 which is sealed against entry of combustible gases. The motor 3 may also be cooled by the hydraulic fluid which drives it.

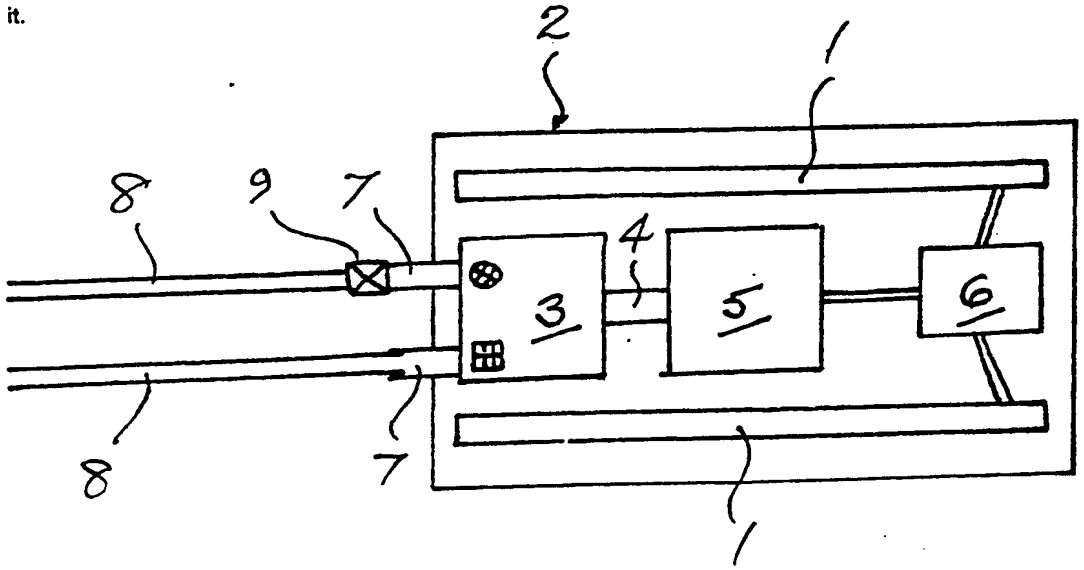

FIGURE 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1982.

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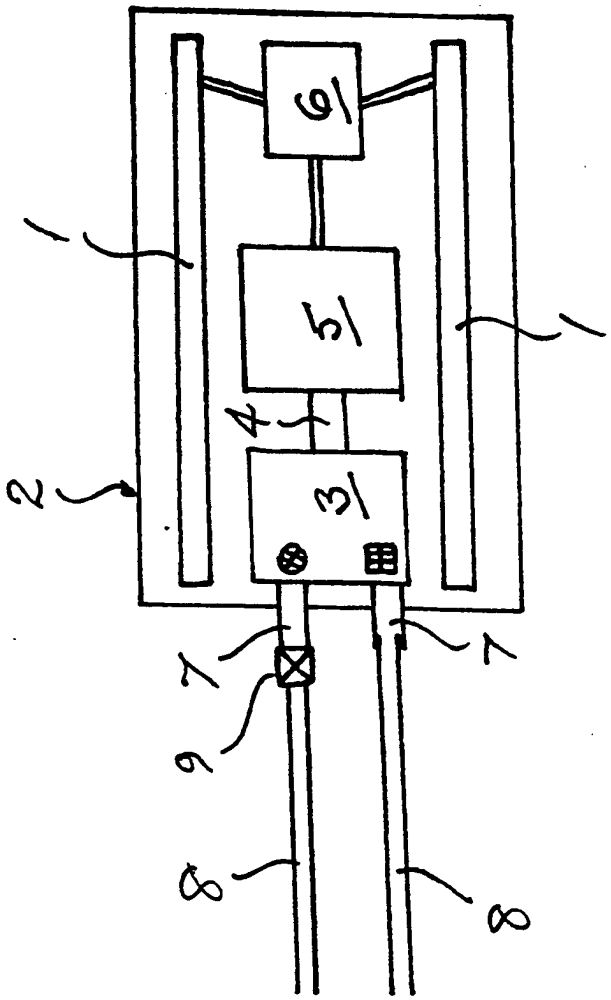

FIGURE 1

POWER SUPPLY SYSTEM

Background to the Invention

The invention relates to a system for supplying power to an electrical device, and is of particular application to the supply of power to electrical devices which are to be used in situations in which there is a fire or explosion risk.

Where electrical devices are to be used in environments in which the risk of explosion or fire is high, for example on oil rigs or in coal mines, it is necessary to take precautions to minimise the possibility of the devices causing fire or explosion.

One way of achieving that end is to make such devices "intrinsically safe" by ensuring that relatively low levels of voltage and current, levels not exceeding predetermined maximum safety limits, are used by the devices. However, this approach cannot be used if such levels of voltage and current would not provide the required amount of power to operate an electrical device.

An alternative approach is to house the electrical device in a container which prevents the device coming into contact with combustible gasses. Such a container will be referred to as a container of the kind specified, and may be, for example, a container complying with BASEEFA safety standards.

With the latter approach, however, there may still be unacceptbale risk if electrical supply cables are used to supply power to the device, since damage to the cables or to their connections to the device may cause sparking or heating. A known solution to this problem is to provide the electrical device with its own power source housed within the same container. Such equipment is inevitably bulky and prone to malfunctions as the power source is drained.

In its broadest aspect, according to the invention, there is provided a system for supplying power to an electrical device, the system comprising a container of the kind specified; a hydraulic motor; a generator connected to the output of the motor and arranged to supply electrical power to the device, the hydraulic motor, the generator and the electrical device all being housed within the container, and the container being provided with an inlet and an outlet to enable hydraulic fluid to be supplied to the motor.

The electrical device, may, for example, be a light.

In the oil industry in particular, a great deal of work is performed by contractors using mobile, self contained equipment which, in the majority of cases, includes its own hydraulic power system.

The invention thus enables an electrical device to be operated using a readily availble power source.

Description of an Embodiment

Figure 1 schematically shows an electrical device comprising a pair of electrical lights which, in use, are powered by a system according to the invention. The system includes

a container 2 which houses a hydraulic motor 3, having an output shaft 4 which is connected to a generator 5. The output of the generator 5 is connected to the lights 1 via an interface unit 6.

The motor 3 communicates, in use, with a source of hydraulic fluid via a pair of tubular connectors 7 passing through a corresponding pair of orifices in the container 2, one or both of the tubular connectors 7 being, in use, connected to a pair of hydraulic hoses 8. In each orifice of the container 2 there is provided a flexible seal which seals between the tubular connector 7 and periphery of the orifice so as to prevent combustible gases entering the container 2 between the orifice and the tubular connectors 7.

A valve 9 is connected in series between a tubular connector 7 and a hose 8, and, in effect, functions as a switch for the lights 1.

Thus, with the valve 9 opened and the hoses 8 connected to a supply of hydraulic fluid, the motor 3 operates to drive the generator 5. The electrical power consequently generated by the generator 5 is, in turn, relayed to, and thus activates, the lights 1 via the interface unit 6.

Depending on the nature of the lights 1 the interface unit 6 may include means converting the voltages and currents produced, in use, by the generator 5 into values suitable for use on the lights 1.

The lights 1 may be turned off by closing the valve 9.

Since the hydraulic hoses 8 are used to supply the power necessary to operate the lights 1, the system avoids the problems associated with connecting the lights to an external electrical power source via electrical supply cables.

It is envisaged that, as well as operating the motor 3, hydraulic fluid supplied through the hoses 8 will also serve to cool the motor 3, the heat generated by the motor 3 being transferred to the hydraulic fluid using a suitable heat exchanger. The hydraulic fluid so heated then travels out of the motor outlet, through the associated hose 8 and then into a remote cooling device.

CLAIMS:

1. A system for supplying power to an electrical device, the system comprising a container of the kind specified; a hydraulic motor; a generator connected to the output of the motor and arranged to supply electrical power to the device, the hydraulic motor, the generator and the electrical device all being housed within the container, and the container being provided with an inlet and an outlet to enable hydraulic fluid to be supplied to the motor.

2. A system constructed and arranged substantially as described herein with reference to and as illustrated in the accompanying drawing.

...High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office.

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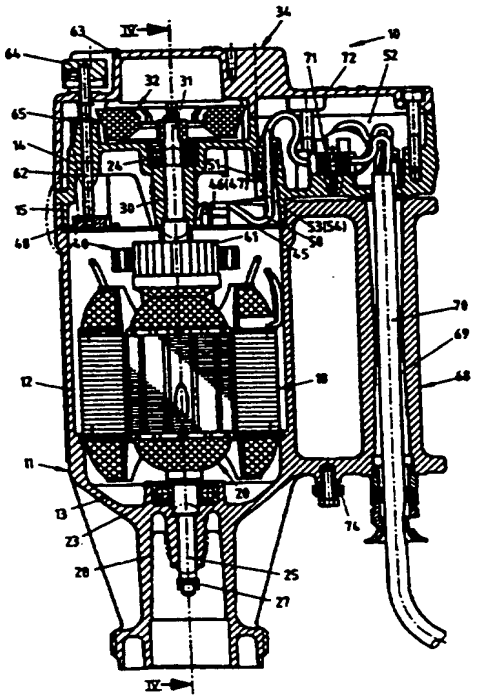
(54) Surface cooled electric motor

(57) An electrical motor comprises an encapsulated motor housing (11) which is closed at both ends by bearing plates (13, 14) and in use is connected to earth potential. Arranged in the housing are a stator (18) and a rotor (20) with a rotor shaft (22), which is rotatably mounted in the bearing plates and extends out of the housing at both ends. A fan wheel (32), which is covered by a cap (34), is arranged on the shaft (22) outside the housing at an end remote from a drive output end. The cap encloses the adjacent bearing plate (4) and forms cooling air outflow paths for guidance of cooling air from the fan wheel to and over those regions of the housing (11) which surround the stator and the rotor. A mounting plate (15), through which the shaft (22) extends and which receives electrical connecting and switching elements (46, 47) arranged peripherally to the shaft, is arranged within the housing remote from the drive output side. Electrical supply lines (50) are led from these connecting and switching elements out of the motor housing by way of pressure-tight feedthroughs (51).

Fig.3



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